DEFINITION AND IDENTIFICATION OF INDIANA NATURAL AREAS

In this day of increasing pressure for undeveloped land, compromises must be made between the remaining land resources and those factors inducing development. Land development continues to destroy much of the remaining high quality natural areas.

In Indiana, the 1967 General Assembly passed Senate Enrolled Act 176 which defined a natural area as an “area of land or water in public or private ownership which either retained or has re-established it's natural character.”

Within the state, there are several types of natural areas including scenic, geological, aquatic, terrestrial, and endangered species habitats. Unfortunately, there are no areas within Indiana that can be considered wilderness, and there are very few, if any, virgin or untouched lands. Most of the remaining natural areas consist of lands that have been re-established as secondary growth as long as 200 years ago. Only 0.02% of the total state could be described as natural areas of high quality.

Preservation of these limited natural areas is easier said than done when construction or reconstruction of a highway facility is required. It is here the proper application of the environmental process is essential. As we know, the red tape and time delays involved in environmental processing can become very costly.

As could be expected, early identification of potential areas of conflict is the key to efficient compromise between state and federal regulatory agencies. Moving the alignment to avoid a natural area might be more expedient but at the same time could be an unreasonable alternative. If this is the case, mitigation measures must be designed to minimize harm to a natural area.
DESIGN AND REVEGETATE TO MINIMIZE ENVIRONMENTAL CONSTRUCTION DAMAGE

Mitigation measures may include either revegetation or designing to meet the aesthetics of the area. These features are very important both to the eye of the roadway user and the wildlife using the area as habitat. Tree and shrub plantings placed at the top of a cut and/or at the toe of slope are beneficial to wildlife while allowing for snow plowing, safety, and storage.

Molding the slope to conform with the existing terrain is another design feature which can actively mitigate obtrusive cuts and associated erosion control problems. The provision for staggered benching with planting pockets for revegetation can reflect continuity between natural terrain and the highway facility.

Wildlife habitat destroyed by a construction project can be replaced by providing wet areas and hedgerow habitat along fence lines. Borrow pits are of special importance since many species thrive near well-planned aquatic habitat.

WETLANDS: AREAS, USEFULNESS, CONSTRUCTION DAMAGE, MITIGATION

Wetlands habitat are especially vulnerable to damage from the construction process. During the past 100 years, over 1,000,000 acres of wetlands are left in Indiana. Only about 100,000 acres of wetlands are left in Indiana. Half of this is considered open water wetlands with high fisheries value but low wildlife value. Wetlands are areas where the water table is at, near, or above the land surface long enough to promote the formation of hydric soils and hydrophilic plants. The value of wetlands areas are finally being realized by the general public as well as the biologist. Both federal and state laws and guidelines now exist protecting wetland areas. Wetlands are invaluable for increasing the capacity of streams and rivers during floods. They store and convey flood flows without inundating adjacent land. They are also important erosion control and storm barriers. Wetlands and their associated vegetation effectively help stabilize the surface materials. Their complex root systems and dense emergent vegetation help dissipate the energy of flowing waters, acting as barriers to destructive storm waves. Wetlands also trap and filter sediment, assimilating nutrients. In some areas, wetlands are being studied for use as tertiary sewage treatment facilities. Wetlands are also important in maintaining both ground and surface water supplies. Wetlands are among the most productive environments on earth. Over two-thirds of the commercial
marine catch consists of species dependent at some time in its life cycle on a wetlands area. Wetlands are also among the richest wildlife habitats in the world. Thirty-five percent of this country's rare or endangered species are either located in or dependent upon a wetlands area although wetlands comprise only 3.5% of the nation's land area. The Midwest's prairie potholes provide habitat for half of the nation's waterfowl.

Construction in or near a wetlands area, if done improperly, can have a devastating effect on the wetlands. Significant artificial changes in the depths of a wetlands will change its entire character. Highways tend to impound the flow of surface and ground water, raising the levels on the upflow side of the structure and lowering the levels on the downflow side. There is good evidence that the presence of a highway at approximate right angles to surface and ground water flows may change the seasonal flow pattern and water movement in wetlands. Highways may also present barriers to animal movement or cause vegetational changes. Freshwater wetlands are especially vulnerable to elevated salt concentrations as a result of winter salting. Other chemicals from the highway area such as grease, oil, heavy metals, and herbicides also adversely affect wetlands areas. If the avoidance of a wetlands area is impossible, then various mitigation features should be incorporated into the project's design and plans and specifications to help minimize damage. The careful use of erosion control methodology is perhaps one of the most important mitigation tools. Others include the wise selection of borrow areas, the use and disposal of spoil material, the use of culverts and other devices to maintain hydrologic conditions, the use of clean water diversions, consideration for heavy equipment parking and turning facilities and use of highway to create new habitat.

STREAM DAMAGE BY CHANNELIZATION AND RELOCATION

Channelization and channel relocations are construction activities that when not carefully planned can result in extensive damage to both aquatic and terrestrial wildlife. Various studies have indicated that many streams, even after 50 years, have not recovered from the adverse impacts of channel relocation. Typical adverse impacts include the total removal of vegetation from the stream, its bank and beyond and the vast reduction of stream bottom dwellers. It also causes a significant reduction in the size and numbers of fish, in species diversity and stream quality. The water temperature may increase as a result of a lack of shade and the flatter, shallower bottom of the relocated stream. Flow
rates of the stream may also change. These impacts are all accentuated by an increase in siltation and turbidity downstream.

The most damaging impact is the total removal of vegetation in the area of a stream relocation. The natural vegetation along a stream bank is extremely important in controlling excessive water temperature, furnishing food and shelter, soil erosion control, and terrestrial wildlife habitat. A North Carolina study has found a direct correlation between the return of stream bank vegetation and the rate of stream recovery. It is very important to keep vegetation removal to a minimum. If possible, the vegetation on at least one stream bank should be left undisturbed. Revegetation of the stream banks should take place as soon as possible. Another important factor minimizing the impact of stream relocation is the new alignment of the relocated channel. It should reflect as closely as possible the original stream’s channel alignment. Other factors mitigating adverse impacts to the stream are the use of fish pools/sediment traps, log dams, log and rock deflectors and randomly placed boulders.

PRESERVATION OF HISTORICAL BRIDGES

The preservation of historically significant bridges is an area of increasing concern within the State of Indiana, as well as the rest of the nation. It concerns the historic preservation officer that one might be removed, and it concerns bridge designers even more that they may have to deal with one that might be removed. At the present time, any bridge over 40 years old is evaluated by the Indiana Department of Natural Resources for possible historic significance. Structures that are old or of a unique design may be historically significant, and therefore, eligible for inclusion in the National Register of Historic Places. The state historic preservation officer makes the preliminary decision as to the eligibility of the bridge. The U.S. Secretary of the Interior makes the final determination. The Indiana State Highway Commission must comply with the final determination if federal funding participation is involved.

The following are some of the structures that might be considered as historically significant by the Indiana Department of Natural Resources:

a. Two unusual concrete bridges include the open spandel arch and the thru concrete arch

b. A few truss bridges that might be considered unusual or as historically significant are:
   1. Lattice or double intersection Warren Truss
   2. Warren Truss with verticals
3. Double intersection Whipple
4. Truss bridge with subdivided panels
5. Leg bedstead truss

CONCLUSION

The environmental process was designed as a tool to be used during the decision-making phase of the project. Used properly, it can minimize social, and environmental problems associated with the development, design, and construction of highway projects.